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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,063	05/31/2001	David L. Barron	SC11447ZC	8966

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FREESCALE SEMICONDUCTOR, INC.  
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EXAMINER
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NOLAN, DANIEL A

ART UNIT	PAPER NUMBER
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2654

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/871,063

Applicant(s)

BARRON ET AL.

Examiner

Daniel A. Nolan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,3-7,9 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,3,4 and 10 is/are allowed.
- 6) ☒ Claim(s) 5-7 and 9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### ***Response to Amendment***

2. The filing of 18 June 2004 was applied to the following effect:
  - The specification was changed as indicated and the objections are withdrawn.
  - Claims 2, 8 and 11 were cancelled and the objections are withdrawn as moot.
  - The claims were changed as indicated and the objections withdrawn as satisfied.The remaining claims were examined on the merits as changed.

#### ***Response to Arguments***

3. Applicant's arguments, see from the 11<sup>th</sup> line of page 9 to the 7<sup>th</sup> line of page 10, filed 18 June 2004, with respect to claims 5-10 have been fully considered and are persuasive. The objection to claims 5-10 has been withdrawn.

Applicant's arguments, see 2<sup>nd</sup> paragraph page 10, filed 18 June 2004, with respect to claims 6 and 7 have been fully considered and are persuasive. The objection to claims 6 and 7 has been withdrawn.

Applicant's arguments, see 3<sup>rd</sup> paragraph page 10, filed 18 June 2004, with respect to claim 9, has been fully considered and are persuasive. The objection to claim 9 has been withdrawn.

Applicant's understanding that the features found in cancelled claim 11 were allowable was correct. The Examiner understands that "claims 6, 7 and 9" are intended by the 7<sup>th</sup> line from the end of page 13.

***Claim Rejections - 35 USC § 103***

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Campbell et al<sup>'653</sup> & Bahl et al**

5. Claims 5-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al<sup>'653</sup> (U.S. Patent 5,946,653 A) in view of Bahl et al (US 5,615,299 A).

6. Regarding claim 5, Campbell et al<sup>653</sup> read on the features of the claim for *identifying a spoken command* as follows:

- Campbell et al<sup>653</sup> read on the feature for *generating speech building blocks in a training mode* (104 in figure 1 – see column 10 line 6) *by providing a polynomial expansion of 1<sup>st</sup> (training) vectors* (108 in figure 1);
- Campbell et al<sup>653</sup> read on the feature for *generating 2<sup>nd</sup> (non-training) vectors from a speech input in a non-training mode* (206 in figure 2);
- Campbell et al<sup>653</sup> read on the feature for *correlating the 1<sup>st</sup> (training) vectors generated in the training mode* (column 10 lines 16-23) *with the 2<sup>nd</sup> (non-training) vectors generated from the spoken command in the non-training mode* (212-216 in figure 2);

Where Campbell et al<sup>653</sup> do not specifically designate the product as *generating speech building blocks*, Bahl et al, with the invention for *speech recognition using dynamic features*, teaches the feature of using subword elements in *generating speech building blocks in a training mode* (column 1 lines 43-46). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Bahl et al to the device/method of Campbell et al<sup>653</sup> to train using small amounts of data instead of several samples of each word.

Campbell et al<sup>653</sup> do not mention HMM. Bahl et al reads on the feature that *the 3<sup>rd</sup> section performs a Hidden Markov Model statistical analysis of a correlated feature vector* (column 1 lines 26-34) *to identify the spoken command*. It would have been

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obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Bahl *et al* to the device/method of Campbell *et al*<sup>653</sup> to use "states" to increase the probability of recognizing a certain sound (as being a word).

7. Regarding claim 6 as understood by the Examiner, the claim is set forth with the same limits as claim 5. Campbell *et al*<sup>653</sup> read on the feature for *expanding the recognizer's vocabulary into a set of at least 4<sup>th</sup> order vectors in the training mode* (column 4 lines 23-24).

8. Regarding claim 7 as understood by the Examiner, the claim is set forth with the same limits as claim 5. Campbell *et al*<sup>653</sup> read on the feature that *generating the vectors from a speech input in a non-training mode includes generating at least 4<sup>th</sup> order vectors* (claim 16 lines 25-32).

9. Regarding claim 9 as understood by the Examiner, the claim is set forth with the same limits as claim 5. Campbell *et al*<sup>653</sup> read on the feature that *generating 2<sup>nd</sup> (training) vectors includes representing the spoken command by a plurality of spoken feature vectors (304 in figure 3); summing the plurality of spoken feature vectors to create a vector for the spoken command (306→310 in figure 3); and generating a polynomial expansion of the vector (310→312 in figure 3).*

***Allowable Subject Matter***

10. Claims 1, 3-4 and 10 are allowed.

11. The following is a statement of reasons for the indication of allowable subject matter:

- The present invention is directed to *mathematically recognizing speech*.
- Claim 1 identifies the uniquely distinct feature that *the 3<sup>rd</sup> section (during recognition) includes "a sequence vector block having an input for receiving a signal from the correlator block, an HMM table having an output; and a Viterbi block having a 1<sup>st</sup> (non-training) input coupled to the sequence vector block, a 2<sup>nd</sup> (training) input coupled to the HMM table, and an output that provides a state sequence that maximizes a probability of identifying the spoken command."*

The closest prior art, Huang et al, (column 12 lines 1-7, 17-20 and 52-62) processes *sequence states* on a *word* level to construct probable matches from acoustic scores while the prior art of Mizuta et al teaches *an HMM table; Viterbi processing and an output that provides a state sequence that maximizes a probability of identifying the spoken command* but on a *pattern, not polynomial*, basis, so the above underlined features are neither anticipated nor were they found in obvious combination in the prior art of reference.

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- Regarding claim 10, the closest prior art of Campbell et al<sup>653</sup> discloses *averaging consecutive polynomial expansions* (column 7 lines 6-10 being *consecutive* by virtue of being created together) *after generating a polynomial expansion* (208 in figure 2).

The converse order of pre-processing in the application makes the feature of *averaging consecutive polynomial expansions prior to generating a polynomial expansion of the 1<sup>st</sup>* (non-training) *set of feature vectors* to be neither anticipated nor found in obvious combination in the prior art of record.

- Claims 3 and 4 depend from a claim that was found to be allowable.

### **Conclusion**

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- de Souza et al (US 5,884,261 A) tone-sensitive acoustic modeling using fenones as building blocks.
- Holzrichter (US 6,006,175 A) non-acoustic speech characterization and recognition using algorithms as building blocks for more complex speech organ descriptions.

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel A. Nolan whose telephone number is (703) 305-1368. The examiner can normally be reached on Mon, Tue, Thu & Fri, from 7 AM to 5 PM. If attempts to contact the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached at (703)305-9645.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. The fax phone number for Technology Center 2600 is (703)872-9314. Label informal and draft communications as "DRAFT" or "PROPOSED", & designate formal communications as "EXPEDITED PROCEDURE". Formal response to this action may be faxed according to the above instructions,

or mailed to:

P.O. Box 1450  
Alexandria, VA 22313-1450

or hand-deliver to: Crystal Park 2,  
2121 Crystal Drive, Arlington, VA,  
Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Technology Center 2600 Customer Service Office at telephone number (703) 306-0377.

Daniel A. Nolan  
Examiner  
Art Unit 2654

DAN/d  
September 28, 2004

  
**RICHEMOND DORVIL**  
**SUPERVISORY PATENT EXAMINER**